

Appl. No. 10/085,620
Amdt. dated August 13, 2003
Reply to Office Action of July 9, 2003

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (original): An optical element for beam shaping of an optical laser beam emission of a diode laser, said optical element comprising:

 a first element arranged for collimation of a fast axis of the laser beam emission; and

 a second element arranged for rotation of the laser beam emission by substantially $\pm 90^\circ$,
characterized in that both said first and second elements are optically bonded to each other
constituting at least a quasi-monolithic single optical element.

Claim 2 (original): The optical element according to claim 1, wherein both elements constitute a single monolithic element.

Claim 3 (original): The optical element according to claim 1, wherein said second element constitutes an array of optical beam rotation elements, optically bonded to each other constituting at least a quasi-monolithic single optical element.

Claim 4 (original): The optical element according to claim 3, wherein said second element constitutes a single monolithic array of optical beam rotation elements.

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Claim 5 (original): The optical element according to claim 1, further comprising a third element for collimation of a slow axis of the laser beam emission,

characterized in that said third optical element is optically bonded to either side of said second element constituting at least a quasi-monolithic single optical element.

Claim 6 (original): The optical element according to claim 5, wherein all three elements constitute a single monolithic element.

Claim 7 (original): The optical element according to claim 5, wherein said third element constitutes a planar grin lens.

Claim 8 (original): The optical element according to claim 5, wherein said third element constitutes a planar grin lens array.

Claim 9 (original): The optical element according to claim 5, wherein said third element constitutes a surface curved in both or either of the directions orthogonal to the propagation direction.

Claim 10 (original): The optical element according to claim 5, wherein said third element constitutes a multi-facet surface in both or either of the directions orthogonal to the propagation direction curved in both or either of the directions orthogonal to the propagation direction.

Claim 11 (original): An optical element according to claim 5, further comprising cylindrical, spherical or aspherical lenses for coupling the diode beam into an optical fiber.

Claim 12 (original): An optical element according to claim 1, further comprising cylindrical, spherical or aspherical lenses for coupling the diode beam into an optical fiber.

Claim 13 (original): The optical element according to claim 1, further comprising a third element for collimation or expansion of the beam-rotated fast axis of the diode laser, characterized in that said third optical element is optically bonded to said second element constituting a quasi-monolithic single optical element.

Claim 14 (original): The optical element according to claim 13, wherein said first, second and third elements constitute a single monolithic element.

Claim 15 (original): The optical element according to claim 1, further comprising a third element for simultaneous (i) collimation of a slow axis of the laser beam emission and (ii) collimation of the laser beam emission after said rotation of said fast axis of the diode laser, characterized in that said third optical element is optically bonded to said second element constituting a quasi-monolithic single optical element.

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Claim 16 (original): The optical element according to claim 15, wherein said first, second and third elements constitute a single monolithic element.

Claim 17 (original): The optical element according to claim 1, where said first element constitutes a planar grin lens.

Claim 18 (original): The optical element according to claim 1, wherein said first element constitutes a uni-axial optical element with its optical axis aligned parallel to a slow axis of the diode laser axis, said first element further comprising a curved input surface and a flat output surface.

Claim 19 (original): The optical element according to claim 1, wherein said second element constitutes a planar grin lens array.

Claim 20 (original): The planar grin lens array according to claim 19, wherein a pitch of said planar grin lens array is equal to approximately 0.5.

Claim 21 (original): The planar grin lens array according to claim 19, wherein planes of equal refractive index in said planar grin lens array are aligned at an angle of substantially $\pm 45^\circ$ with respect to a plane defined by a propagation direction of said laser beam emission and a slow axis of the diode laser.

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Claim 22 (original): The planar grin lens array according to claim 21, wherein a pitch of said planar grin lens array is equal to approximately 0.5.

Claims 23 - 38 (cancelled)

Claim 39 (original): An optical device comprising:

a plurality of optical elements for shaping a respective laser beam emission of a respective diode laser, each of said optical elements including (i) a first component element arranged for collimation of a fast axis of a respective laser beam emission and (ii) a second component element arranged for rotation of a respective laser beam emission by substantially $\pm 90^\circ$;

respective pairs of said first and second component elements optically bonded to each other to form at least a quasi-monolithic single optical element;

said optical elements coupled into a multiple of optical fibers aligned in an optical fiber bundle so as to provide at least one combined beam of high optical power.